

Architects' Specifications *for Southern Pine Lumber*



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Architects' Specifications for Southern Pine Lumber

RECOMMENDED GRADES FOR VARIOUS USES



Southern Pine Association

Architectural and Engineering Service Department

NEW ORLEANS, LA.

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A. I. A. File No. 19a-22

*Apartment and
School Buildings*

*Residences---
High Class*

*Residences---
Medium
Class*

*Store Buildings
and
Light Factories*

*Heavy Factories
and
Warehouses*

*Construction
Specifications*

*Description
of Grades*

*General
Information*

*Grade Marks
Density
End-Matched Lumber
Table of Minimum
Joist Spans
Deflection of Joists
Table*

*Apartment and
School Buildings*

*Residences---
High Class*

*Residences---
Medium
Class*

*Store Buildings
and
Light Factories*

*Heavy Factories
and
Warehouses*

*Construction
Specifications*

*Description
of Grades*

*General
Information*

*Grade Marks
Density
End-Matched Lumber
Table of Minimum
Joist Spans
Deflection of Joists
Table*

Architects' Specifications for Southern Pine Lumber



*T*HIS SPECIFICATION MANUAL is offered with the hope that it will provide a practical and convenient source of information on Southern Pine lumber grades and specifications. It affords the necessary information for specifying lumber for practically every type of building.

The Manual is divided into four parts:

LUMBER SPECIFICATIONS FOR VARIOUS USES.
CONSTRUCTION SPECIFICATIONS.
DESCRIPTION OF GRADES.
GENERAL INFORMATION.

The grades specified are the commercially available grades.

The General Specifications on "Lumber" (repeated at the top of each page) should be included in every specification.

If the specifier of lumber will use the information offered in this Manual, if he will use standard grade names, and specify that the official grade mark be stamped on each piece, he will be assured of receiving lumber that is in accordance with his requirements.



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*Apartment and
School Buildings*

*Residences---
High Class*

*Residences---
Medium
Class*

*Store Buildings
and
Light Factories*

*Heavy Factories
and
Warehouses*

*Construction
Specifications*

*Description
of Grades*

*General
Information*

*Grade Marks
Density
End-Matched Lumber
Table of Minimum
Joist Spans
Deflection of Joists
Table*

LUMBER SPECIFICATIONS FOR VARIOUS USES



To facilitate the writing of lumber specifications for various types of construction, the following data have been so prepared that any paragraph may be transcribed into the lumber specifications for the specific project under development. Permission to use is hereby given to Architects, Engineers and other Specifiers of lumber.

LUMBER:—All lumber shall be of the grade specified. Evidence of grade shall be furnished by the OFFICIAL grade mark on each piece. (See note at foot of page.)

SILLS (Untreated):—All sills shall be MERCHANTABLE grade Long Leaf Southern Pine as specified in the Southern Pine Association grading rules.

NOTE—Where floor level is within 30 inches of ground level, we recommend the grade above be changed to "No. 1 Common 85% Heart Long Leaf Southern Pine" so as to protect against the attack of moisture.

SILLS (Treated):—All sills shall be No. 1 COMMON Short Leaf or Long Leaf Southern Pine as specified in the Southern Pine Association grading rules, treated with a wood preservative approved by the architect.

GIRDERS AND POSTS:—All girders and posts shall be STRUCTURAL SQUARE EDGE AND SOUND grade Long Leaf Southern Pine as specified in the Southern Pine Association grading rules.

NOTE—Where floor level is within 30 inches of ground level, we recommend a change from the above grade to "No. 1 Common 85% Heart Long Leaf Southern Pine" to protect against the attack of moisture.

FLOOR JOISTS (School Buildings):—All joists shall be (State Size*) No. 1 COMMON DENSE Long Leaf Southern Pine.

FLOOR JOISTS (Apartment Buildings):—All joists shall be (State Size*) No. 1 COMMON Long Leaf or Short Leaf Southern Pine.

STUDDING:—All studding shall be (State Size) No. 1 COMMON Long Leaf or Short Leaf Southern Pine.

SUB-FLOORING AND SHEATHING:—All sub-flooring and sheathing shall be 1" x 6" Dressed and Matched No. 2 COMMON Short Leaf or Long Leaf Southern Pine, or 1" x 6" Short Leaf or Long Leaf Southern Pine End-Matched Sub-Flooring and Sheathing.

FINISH FLOORING:—All finish flooring, except where otherwise specified, shall be 25/32" x 2 3/8" EDGE GRAIN B AND BETTER Long Leaf or Short Leaf Southern Pine, or 25/32" x 2 3/8" END-MATCHED EDGE GRAIN SECOND GRADE Long Leaf or Short Leaf Southern Pine.

INTERIOR TRIM (Natural Finish):—All interior trim, including door and window frames, where a natural or clear finish is called for shall be B AND BETTER Short Leaf Southern Pine.

INTERIOR TRIM (Painted or Enameled Finish):—All interior trim, including door and window frames, where a painted or enameled finish is called for shall be B AND BETTER Short Leaf Southern Pine.

* See table of Maximum Joist Spans.

NOTE—The use of the word "official" when specifying that lumber be Grade-Marked is of importance. The specifier is thus asking for lumber the grading of which is policed by the inspection departments of those manufacturing associations to which the species belongs. The architect's attention is called to the subject of Moisture Content. By specifying official SPA grade-mark in Southern Pine, a maximum moisture content is guaranteed by action of the Southern Pine Association in March, 1929. See grade rules.

*Apartment and
School Buildings*

*Residences---
High Class*

*Residences---
Medium
Class*

*Store Buildings
and
Light Factories*

*Heavy Factories
and
Warehouses*

*Construction
Specifications*

*Description
of Grades*

*General
Information*

*Grade Marks
Density
End-Matched Lumber
Table of Minimum
Joist Spans
Deflection of Joists
Table*

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NOTE—Where floor level is within 30 inches of ground level, we recommend the grade above be changed to "No. 1 Common 85% Heart Long Leaf Southern Pine" so as to protect against the attack of moisture.

SILLS (Treated):—All sills shall be No. 1 COMMON Short Leaf or Long Leaf Southern Pine as specified in the Southern Pine Association grading rules, treated with a wood preservative approved by the architect.

FLOOR JOISTS:—All floor joists shall be (State Size) NO. 1 COMMON Long Leaf or Short Leaf Southern Pine spaced 16 inches on centers, excepting under bathrooms, which shall be 12 inches on centers.

NOTE—Where floor level is within 30 inches of ground level, we recommend a change from the above grade to "No. 1 Common 85% Heart Long Leaf Southern Pine" to protect against the attack of moisture.

STUDDING:—All studding shall be 2 x 4 (or 2 x 6) No. 1 COMMON Short Leaf or Long Leaf Southern Pine, spaced 16 inches on centers.

LATH:—All lath shall be No. 1 Short Leaf or Long Leaf Southern Pine. Evidence of grade shall be furnished by the official grade mark on a tag attached to each bundle of lath.

SUB-FLOORING AND SHEATHING:—All sub-flooring and sheathing shall be 1" x 6" Dressed and Matched No. 2 COMMON Short Leaf or Long Leaf Southern Pine, or 1" x 6" Short Leaf or Long Leaf Southern Pine END-MATCHED SUB-FLOORING AND SHEATHING.

FINISH FLOORING:—All finish flooring, except where otherwise specified, shall be 25/32" x 2 3/8" EDGE GRAIN B AND BETTER Long Leaf or Short Leaf Southern Pine, or 25/32" x 2 3/8" Long Leaf or Short Leaf Southern Pine END-MATCHED EDGE GRAIN SECOND GRADE.

INTERIOR TRIM (Natural Finish):—All interior trim, including door and window frames, where a natural or clear finish is called for shall be B AND BETTER Short Leaf Southern Pine.

INTERIOR TRIM (Painted or Enameled Finish):—All interior trim, including door and window frames, where a painted or enameled finish is called for shall be B AND BETTER Short Leaf Southern Pine.

EXTERIOR TRIM:—All exterior trim, including window sills and door and window frames, shall be B AND BETTER HEART Long Leaf Southern Pine.

DROP SIDING:—All drop siding shall be pattern No. (see patterns in Southern Pine Association grade rule book) B and Better Long Leaf or Short Leaf Southern Pine.

PORCHES:—All porches shall be floored with 25/32" x 3 1/4" (or 25/32" x 2 3/8") B AND BETTER HEART EDGE GRAIN Long Leaf Southern Pine.

CONSTRUCTION SPECIFICATIONS:—See page 8.

NOTE—The use of the word "official" when specifying that lumber be Grade-Marked is of importance. The specifier is thus asking for lumber the grading of which is policed by the inspection departments of those manufacturing associations to which the species belongs. The architect's attention is called to the subject of Moisture Content. By specifying official SPA grade-mark in Southern Pine, a maximum moisture content is guaranteed by action of the Southern Pine Association in March, 1929. See grade rules.

*Residences---
High Class*

*Residences---
Medium
Class*

*Store Buildings
and
Light Factories*

*Heavy Factories
and
Warehouses*

*Construction
Specifications*

*Description
of Grades*

*General
Information*

*Grade Marks
Density
End-Matched Lumber
Table of Minimum
Joist Spans
Deflection of Joists
Table*

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SILLS (Untreated):—All sills shall be MERCHANTABLE grade Long Leaf Southern Pine as specified in the Southern Pine Association grading rules.

NOTE—Where floor level is within 30 inches of ground level, we recommend the grade above be changed to "No. 1 Common 85% Heart Long Leaf Southern Pine" so as to protect against the attack of moisture.

SILLS (Treated):—All sills shall be No. 1 COMMON Short Leaf or Long Leaf Southern Pine as specified in the Southern Pine Association grading rules, treated with a wood preservative approved by the architect.

FLOOR JOISTS:—All joists shall be 2 x 10 No. 2 COMMON Long Leaf or Short Leaf Southern Pine, spaced 16 inches on centers, excepting under bathrooms, which shall be 12 inches on centers.

NOTE—Where floor level is within 30 inches of ground level, we recommend a change from the above grade to "No. 1 Common 85% Heart Long Leaf Southern Pine" to protect against the attack of moisture.

STUDDING:—All studding shall be 2 x 4, (or 2 x 6) No. 2 COMMON Long Leaf or Short Leaf Southern Pine, spaced 16 inches on centers.

LATH:—All lath shall be No. 1 Short Leaf or Long Leaf Southern Pine. Evidence of grade shall be furnished by the official grade mark on a tag attached to each bundle of lath.

SUB-FLOORING AND SHEATHING:—All sub-flooring and sheathing shall be 1" x 6" Dressed and Matched No. 3 COMMON Short Leaf or Long Leaf Southern Pine, or 1" x 6" Short Leaf or Long Leaf Southern Pine End-Matched Sub-flooring and Sheathing.

FINISH FLOORING:—All finish flooring in living rooms and hallways shall be 25/32" x 2 3/8" B AND BETTER EDGE GRAIN Long Leaf or Short Leaf Southern Pine or 25/32" x 2 3/8" Long Leaf or Short Leaf Southern Pine END-MATCHED EDGE GRAIN second grade flooring. All wood floorings in bedrooms and kitchens shall be No. 1 COMMON FLAT GRAIN Long Leaf or Short Leaf Southern Pine or Long Leaf or Short Leaf Southern Pine END-MATCHED second grade flat grain flooring.

INTERIOR TRIM (Natural Finish):—All interior trim, including door and window frames, where a natural or clear finish is called for shall be B AND BETTER Short Leaf Southern Pine.

INTERIOR TRIM (Painted or Enameled Finish):—All interior trim, including door and window frames, where a painted or enameled finish is called for shall be No. 1 COMMON Short Leaf Southern Pine.

EXTERIOR TRIM:—All exterior trim, including window sills and door and window frames, shall be B AND BETTER HEART Long Leaf Southern Pine.

DROP SIDING:—All drop siding shall be pattern No. (see patterns in Southern Pine Association grade rule book) No. 1 COMMON Long Leaf or Short Leaf Southern Pine.

PORCHES:—All porches shall be floored with 25/32" x 3 1/4" (or 25/32" x 2 3/8") B AND BETTER HEART EDGE GRAIN Long Leaf Southern Pine.

CONSTRUCTION SPECIFICATIONS:—See page 8.

NOTE—The use of the word "official" when specifying that lumber be Grade-Marked is of importance. The specifier is thus asking for lumber the grading of which is policed by the inspection departments of those manufacturing associations to which the species belongs. The architect's attention is called to the subject of Moisture Content. By specifying official SPA grade-mark in Southern Pine, a maximum moisture content is guaranteed by action of the Southern Pine Association in March, 1929. See grade rules.

*Residences---
Medium
Class*

*Store Buildings
and
Light Factories*

*Heavy Factories
and
Warehouses*

*Construction
Specifications*

*Description
of Grades*

*General
Information*

*Grade Marks
Density
End-Matched Lumber
Table of Minimum
Joist Spans
Deflection of Joists
Table*

LUMBER:—All lumber shall be of the grade specified. Evidence of grade shall be furnished by the OFFICIAL grade mark on each piece. (See note at foot of page.)

SILLS (Untreated):—All sills shall be MERCHANTABLE grade Long Leaf Southern Pine as specified in the Southern Pine Association grading rules.

NOTE—Where floor level is within 30 inches of ground level, we recommend the grade above be changed to "No. 1 Common 85% Heart Long Leaf Southern Pine" so as to protect against the attack of moisture.

SILLS (Treated):—All sills shall be No. 1 COMMON Short Leaf or Long Leaf Southern Pine as specified in the Southern Pine Association grading rules, treated with a wood preservative approved by the architect.

POSTS AND GIRDERS:—All posts and girders shall be STRUCTURAL SQUARE EDGE AND SOUND Long Leaf Southern Pine as specified in the Southern Pine Association grading rules.

FLOOR JOISTS:—All floor joists shall be (State Size*) No. 1 COMMON DENSE Long Leaf Southern Pine.

NOTE—Where floor level is within 30 inches of ground level, we recommend a change from the above grade to "No. 1 Common 85% Heart Long Leaf Southern Pine" to protect against the attack of moisture.

STUDDING (Load Bearing):—All studding shall be 2 x 6 No. 1 COMMON DENSE Long Leaf or Short Leaf Southern Pine.

SUB-FLOORING:—All sub-flooring shall be 1" x 6" Dressed and Matched No. 2 COMMON Short Leaf or Long Leaf Southern Pine, or Short Leaf or Long Leaf Southern Pine END-MATCHED SUB-FLOORING.

SHEATHING:—All sheathing shall be 1" x 6" Dressed and Matched, No. 2 COMMON Short Leaf or Long Leaf Southern Pine, or 1" x 6" Short Leaf or Long Leaf Southern Pine END-MATCHED SUB-FLOORING AND SHEATHING.

FINISH FLOORING (Where excellent wearing surface is required):—All finish flooring shall be 25/32" x 3 1/4" EDGE GRAIN, B AND BETTER Long Leaf Southern Pine, or Long Leaf Southern Pine END-MATCHED EDGE GRAIN SECOND GRADE FLOORING.

FINISH FLOORING (Where best wearing surface is not necessary):—All finish flooring shall be 25/32" x 3 1/4" No. 1 COMMON Long Leaf and Short Leaf Southern Pine, or 25/32" x 3 1/4" Long Leaf or Short Leaf Southern Pine END-MATCHED SECOND GRADE.

INTERIOR TRIM:—All interior trim, including door and window frames, shall be B AND BETTER Short Leaf Southern Pine.

EXTERIOR TRIM:—All exterior trim, including window sills and door and window frames, shall be B AND BETTER HEART Long Leaf Southern Pine.

CEILING:—All ceiling shall be 9/16" x 3 1/4" B AND BETTER Short Leaf or Long Leaf Southern Pine, dressed BC&E.

* See table of Maximum Joist Spans.

NOTE—The use of the word "official" when specifying that lumber be Grade-Marked is of importance. The specifier is thus asking for lumber the grading of which is policed by the inspection departments of those manufacturing associations to which the species belongs. The architect's attention is called to the subject of Moisture Content. By specifying official SPA grade-mark in Southern Pine, a maximum moisture content is guaranteed by action of the Southern Pine Association in March, 1929. See grade rules.

*Store Buildings
and
Light Factories*

*Heavy Factories
and
Warehouses*

*Construction
Specifications*

*Description
of Grades*

*General
Information*

*Grade Marks
Density
End-Matched Lumber
Table of Minimum
Joist Spans
Deflection of Joists
Table*

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SILLS (Untreated):—All sills shall be MERCHANTABLE grade Long Leaf Southern Pine as specified in the Southern Pine Association grading rules.

SILLS (Treated):—All sills shall be No. 1 COMMON Short Leaf or Long Leaf Southern Pine as specified in the Southern Pine Association grading rules, treated with a wood preservative approved by the architect.

POSTS AND GIRDERS:—All posts and girders shall be STRUCTURAL SQUARE EDGE AND SOUND Long Leaf Southern Pine as specified in the Southern Pine Association grading rules.

LAMINATED FLOORING (Heavy Duty):—All laminated flooring shall be 2 x 4 No. 1 COMMON Long Leaf Southern Pine.

PLANK FLOORING (Heavy Duty—Damp Conditions):—All plank flooring shall be (State whether 2", 2½" or 3" thick x 8") DRESSED AND MATCHED (or Grooved and Splined) SELECT MERCHANTABLE grade of Long Leaf Southern Pine Factory Flooring. (See Note.)

NOTE—Where Grooved and Splined flooring is used, include following specification for splines:

"Splines—Splines shall be 7/16" thick by ¾" wide for 2" and 2½" flooring. For thicker material splines shall be ¾" thick by ¾" wide. All splines shall be rounded on all four corners on ⅛" radius."

NOTE—Where factory flooring is subjected to moist conditions, or where highly humid conditions exist, we recommend change of grade specified above be changed to read: "No. 1 Common 85% Heart Long Leaf Southern Pine to be run to standard factory flooring pattern."

PLANK FLOORING (Heavy Duty—Dry Conditions):—All plank flooring shall be (State whether 2", 2½" or 3" x 8") DRESSED AND MATCHED (or Grooved and Splined "STANDARD" grade of Long Leaf or Short Leaf Southern Pine Factory Flooring. (See Note.)

NOTE—Where Grooved and Splined flooring is used, include following specification for splines:

"Splines—Splines shall be 7/16" thick by ¾" wide for 2" and 2½" flooring. For thicker material splines shall be ¾" thick by ¾" wide. All splines shall be rounded on all four corners on ⅛" radius."

FINISH FLOORING (Where desired for extra wearing surface):—All finish flooring shall be 25/32" x 3¼" EDGE GRAIN B AND BETTER Long Leaf Southern Pine, or 25/32" x 3¼" Long Leaf Southern Pine END-MATCHED EDGE GRAIN SECOND GRADE.

CEILING:—All ceiling shall be 9/16" x 3¼" B AND BETTER Short Leaf or Long Leaf Southern Pine, dressed BC&E.

NOTE—The use of the word "official" when specifying that lumber be Grade-Marked is of importance. The specifier is thus asking for lumber the grading of which is policed by the inspection departments of those manufacturing associations to which the species belongs. The architect's attention is called to the subject of Moisture Content. By specifying official SPA grade-mark in Southern Pine, a maximum moisture content is guaranteed by action of the Southern Pine Association in March, 1929. See grade rules.

*Heavy Factories
and
Warehouses*

*Construction
Specifications*

*Description
of Grades*

*General
Information*

*Grade Marks
Density
End-Matched Lumber
Table of Minimum
Joist Spans
Deflection of Joists
Table*

CONSTRUCTION SPECIFICATIONS



SILLS:—The sills shall be of the type shown on the plans. Sills shall be securely bolted to the foundation by means of $\frac{3}{4}$ -inch bolts placed every 8 feet and embedded at least 18 inches in the concrete. (*See Figure 1.*)

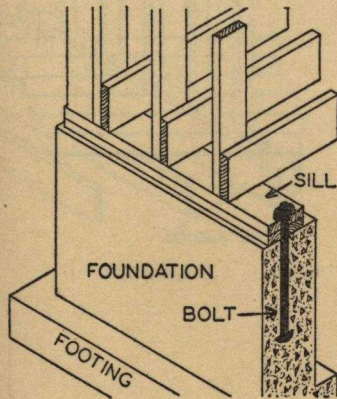


FIGURE 1

JOIST BRIDGING:—All floor joists shall have cross bridging of 1 x 4's or 2 x 2's placed at least every 8 feet in the length of the joist. Bridging shall be beveled and shall be securely nailed at top and bottom with two nails at each end. The bottom shall not be nailed until after the sub-flooring has been laid. (*See Figure 2.*)

STUD BRIDGING:—Single bridging shall be placed between studs in the middle of each story height. Bridging shall be same width as studs. (*See Figure 3.*)

DOUBLE JOISTS:—Two joists shall be placed under partitions which carry a load from the floor above. These joists shall be separated by solid wood bridging so that service pipes may enter the partition without dangerous cutting of the joists. Joists shall be double around chimneys and other similar openings. (*See Figure 3.*)

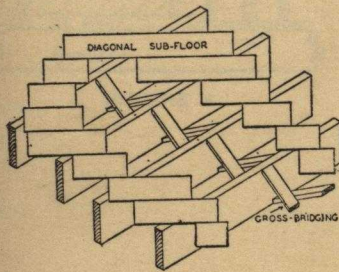


FIGURE 2

DOUBLE STUDS:—Studs shall be doubled at the sides, top and bottom of all window and door openings to supply the strength removed by the cutting of one or more studs. (*See Figure 4.*)

DOUBLE CAPS:—All partitions which carry a load from the floor above shall have a double cap plate.

CORNER BRACES:—All corners shall be braced by putting in braces at an angle of 45 degrees which shall be reversed in direction at opposite ends of the wall. 1 x 4 notched into the studs or 2 x 4 cut in between the studs may be used.

FIRE STOPPING:—Fire stops shall be placed in all walls at the ceiling line and floor line to separate the space between the floor joists and the wall studs.

Construction
Specifications

Description
of Grades

General
Information

Grade Marks
Density
End-Matched Lumber
Table of Minimum
Joist Spans
Deflection of Joists
Table

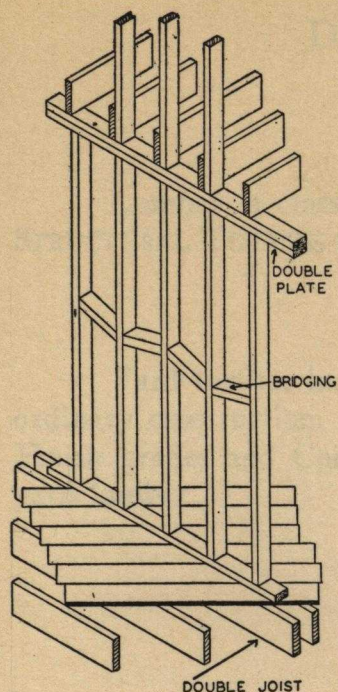


FIGURE 3

ROOF RAFTERS:—Roof rafters shall be anchored to walls by spiking 2-inch plates in every second space between rafters and securely spiking the rafters to these plates. Hip and valley rafters shall be doubled.

SHEATHING:—All outside wall sheathing shall be applied at an angle of 45 degrees, and nailed to each stud with at least two nails.

WALL LINING:—Heavy waterproof felt shall be applied directly to the diagonal sheathing on all outside walls and tightly fitted and fastened around openings.

SUB-FLOORING:—All sub-flooring shall be laid at an angle of 45 degrees with joists and carried in between studs to outside wall sheathing. The direction of the sub-floor shall be opposite on each floor. Shall be nailed to each joist with at least two nails. If sub-flooring is not end-matched the boards shall be cut to end over a joist.

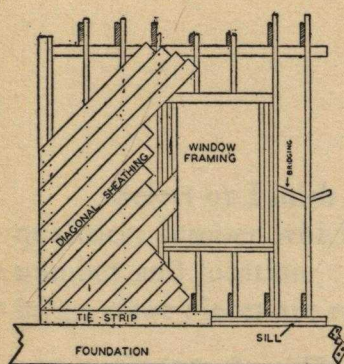


FIGURE 4

FLOORS:—Finish flooring shall not be laid until plaster is thoroughly dry. Flooring shall be driven or wedged up tightly and blind-nailed to each joist. Care must be taken in nailing to prevent hammer marks showing on surface. After the flooring is laid it shall be thoroughly covered to protect it from moisture of any kind.

LATH:—All wood lath to be thoroughly soaked in water, and nailed to each stud, joist or bearing with joints broken not over seven lath to a break. No diagonal or vertical lathing allowed. No lath shall run through or by partitions. A full $\frac{3}{8}$ inch key to be left for lime mortar and not less than a full $\frac{1}{4}$ inch for hard plaster, and a $\frac{1}{4}$ inch space between butt joints of lath.

Description of Grades

General Information

Grade Marks
Density
End-Matched Lumber
Table of Minimum
Joist Spans
Deflection of Joists
Table

DESCRIPTION OF GRADES



Lumber is classified by its principal uses into (a) YARD LUMBER, (b) STRUCTURAL TIMBERS and UTILITY TIMBERS, and (c) SHOP or FACTORY LUMBER.

YARD LUMBER

Yard lumber includes that class of lumber used for general purposes and ordinary construction. Yard lumber is divided into two divisions—Select or Finish grades and Common grades. The following items are included under yard lumber.

DIMENSION
HEAVY JOISTS
COMMON BOARDS AND STRIPS
DRESSED AND MATCHED
SHIPLAP
GROOVED ROOFING
BARN SIDING
LATH
FLOORING
CEILING
PARTITION
DROP AND BEVEL SIDING
MOULDINGS
MOULDED CASING AND BASE
WINDOW AND DOOR JAMBS

Select or Finish grades consist of lumber of good appearance and finishing qualities; lumber which is generally clear, containing defects limited as to size, number and location. It is suitable for finishing purposes or other uses in which large, clear pieces are required. The Select grades are A, B and Better, B, and C.

GRADE A:—This grade must be practically clear of all defects on the face side.

GRADE B AND BETTER:—This grade is a combination of A and B grades and contains all of the A grade produced in manufacturing.

GRADE B:—This grade possesses natural finishing qualities but will admit two small defects in an area of 8 square feet.

GRADE C:—This grade possesses finishing qualities suitable for painting. It permits four small defects in an area of 8 square feet.

Common grades consist of lumber suitable for general utility and construction purposes. The grades are No. 1 Common, No. 2 Common and No. 3 Common.

NO. 1 COMMON:—Presents a generally smooth appearance and is a high class general utility grade. Size and location of defects limited.

*Description
of Grades*

General Information

*Grade Marks
Density
End-Matched Lumber
Table of Minimum
Joist Spans
Deflection of Joists
Table*

No. 2 COMMON:—This grade permits larger defects than No. 1 Common, but no combination of them so serious as to prevent the use of each piece as a whole for medium strength construction requirements, except in the case of Flooring, Ceiling, Partition, Drop Siding and Bevel Siding in which 25% waste is permissible.

No. 3 COMMON:—This grade permits larger defects than No. 2. Suitable for use as cheap building material without wasting more than 25% of the lumber.

STRUCTURAL TIMBERS, JOIST AND PLANK

Structural material is graded primarily on the basis of strength as a beam or post. Defects are limited as to location as well as size and number so that definite stress values can be assigned to the various grades.

The grades under this classification are Select Structural, Dense Heart, Structural Square Edge and Sound, and No. 1 Common.

SELECT STRUCTURAL:—This is an extremely high grade for exceptional uses, as in long spans in bridges where used untreated and where high strength and unusual durability are important.

DENSE HEART:—This grade is expected to furnish most of the timbers used in heavy construction work where high breaking strength is required.

STRUCTURAL SQUARE EDGE AND SOUND:—This grade is for general use in building construction and to a large extent in mill construction. It is especially adapted to treatment with chemical preservatives. Requires all material to conform to the density requirement. Unless otherwise specified this grade admits any amount of sapwood.

No. 1 COMMON:—This grade is described under Utility Timbers, but it is also used as a beam or post where strength requirements are not so critical or where stiffness is the controlling factor.

UTILITY TIMBERS

Utility timbers include grades of timbers intended for the many uses in which the limitation of defects as given for the Structural grades is not necessary. Utility Timbers provide material for such purposes as sills, sheet piling, decking, fenders, in falsework as posts and caps, and many other uses. While the same rigid requirements as to size, number and location of knots is not placed on these grades as on the structural grades, restrictions on defects are such as to make these grades suitable for a wide variety of uses. Where any of these grades is used and unusual hardness or toughness is important, the requirement of density should be added to the grade. There are three grades of Utility Timbers—Merchantable, Square Edge and Sound, and No. 1 Common.

MERCHANTABLE:—This grade is intended for general uses where durability is a consideration. It calls for heart $\frac{2}{3}$ of the surface on one of the wide faces on sizes under 9 inches, and $\frac{2}{3}$ or more heart on both of the wide faces on

General Information

Grade Marks
Density
End-Matched Lumber
Table of Minimum
Joist Spans
Deflection of Joists
Table

sizes over 9 inches. Must be free from injurious shakes, unsound and loose knots and knots in groups that will materially impair the strength. Density is not called for in this grade but may be added.

SQUARE EDGE AND SOUND:—This grade is intended for general uses for treatment with preservatives where conditions of decay exist and untreated where conditions are not favorable to decay. Sapwood is not restricted in this grade and for this reason this grade is particularly adapted to treatment as sapwood is preferred to heartwood where a preservative is applied. Density is not called for in this grade but may be added if the use requires the added strength.

No. 1 COMMON:—This grade is intended for general use and in small houses, falsework, and ordinary construction where strength requirements are not so critical. This grade is also suitable where stiffness is the controlling factor. As the stiffness of the low grades is only slightly less than that of the higher grades, this grade is suitable for many purposes.

DENSITY

Density is a measure of the strength of the wood. The density required for a particular use varies with the conditions of use. The density of the lumber must be at least five percent greater than the density of the material to be used. The percentage of increase must be at least five percent greater than the density of the material to be used.

END-MATCHED LUMBER

End-matched lumber has a single end grain at the end of the board. The end of the board is matched to the end of the board. The use of end-matched lumber results in a saving of material and labor. No cutting at the ends to square up a board is necessary, nor does the joint in match have to match over a knot or grain. The use of end-matched lumber is recommended for flooring, sub-flooring, sheathing, and for forms and many miscellaneous purposes.

General Information

Grade Marks
Density
End-Matched Lumber
Table of Minimum
Joist Spans
Deflection of Joists
Table

GENERAL INFORMATION



GRADE MARKS

Grade marked lumber is lumber which has the grade, as well as the identity of the manufacturer, and the trade-mark or symbol of the regional Association under whose jurisdiction the grades are formulated, stamped on every piece. As this is the mark of the expert grader at the mill, it assures the architect of the grade he has specified. It is an assurance that the lumber is manufactured according to American Lumber Standards and properly seasoned.

DENSITY

Density is a measure of the strength of the wood. The density requirement in Southern Pine means that if there are six or more rings to the inch the lumber must have one-third summerwood, and if less than six rings per inch there must be at least fifty percent summerwood. The percentage of summerwood is the critical feature—not merely the number of rings per inch.

END-MATCHED LUMBER

End-matched lumber has a tongue and groove at the ends the same as on the sides of any matched stock. The use of end-matched lumber results in a saving of material and labor. No cutting at the ends to square up a board is necessary, nor does the joint or match have to meet over a stud or joist. The use of end-matched lumber is recommended for flooring, sub-flooring, sheathing, concrete forms and many miscellaneous purposes.

General Information

*Grade Marks
Density
End-Matched Lumber
Table of Minimum
Joist Spans
Deflection of Joists
Table*

FLOOR JOISTS FOR 12" AND 16" SPACING

DESIGNED FOR LIVE LOAD AND DEAD LOAD.

Fibre stress of 1,600 pounds—shear of 125 pounds.

Where several sizes of joists are possible, they are given so that the most economical size may be selected. Narrower faced joists result in a saving of wall height.

For deflection of joists see table on next page.

D. L. includes weight of joist, 1" sub-floor, and 1" finish floor.

A 10% plastered ceiling can be provided for by selecting the size for a 10% heavier live load.

Span Feet	30% + D.L.		40% + D.L.		50% + D.L.		60% + D.L.		70% + D.L.		80% + D.L.		90% + D.L.		100% + D.L.	
	12"	16"	12"	16"	12"	16"	12"	16"	12"	16"	12"	16"	12"	16"	12"	16"
9	2x4	2x6	2x6	2x6	2x6	2x6	2x6	2x6	2x6	2x6	2x6	2x8	2x6	2x8	2x6	2x8
10	2x4	2x6	2x6	2x6	2x6	2x6	2x6	2x6	2x6	2x8	2x6	2x8	2x8	2x8	2x8	2x8
11	2x6	2x6	2x6	2x6	2x6	2x8	2x6	2x8	2x8	2x8	2x8	2x8	2x8	2x8	2x8	2x10 3x8
12	2x6	2x6	2x6	2x6	2x6	2x8	2x8	2x8	2x8	2x8	2x8	2x10 3x8	2x8	2x10 3x8	2x8	2x10 3x8
13	2x6	2x6	2x6	2x8	2x8	2x8	2x8	2x8	2x8	2x10 3x8	2x8	2x10 3x8	2x10 3x8	2x10 3x8	2x10 3x8	2x10 3x8
14	2x6	2x8	2x8	2x8	2x8	2x8	2x8	2x10 3x8	2x8	2x10 3x8	2x10 3x8	2x10 3x8	2x10 3x8	2x10 3x8	2x10 3x8	2x12 *3x10
15	2x8	2x8	2x8	2x8	2x8	2x10 3x8	2x8	2x10 3x8	2x10 3x8	2x10 3x8	2x10 3x8	2x12 3x10	2x10 3x8	2x12 3x10	2x10 3x8	2x12 *3x10
16	2x8	2x8	2x8	2x8	2x8	2x10 3x8	2x10 3x8	2x10 3x8	2x10 3x8	2x12 3x10	2x10 3x8	2x12 3x10	2x10 3x8	2x12 *3x10	2x12 *3x10	2x12 *3x10
17	2x8	2x8	2x8	2x10 3x8	2x10 3x8	2x10 3x8	2x10 3x8	2x10	2x10 3x8	2x12 *3x10	2x10 3x8	2x12 *3x10	2x12 *3x10	2x12 *3x10	2x12 *3x10	2x14 3x12 *4x10
18	2x8	2x8	2x8	2x10 3x8	2x10 3x8	2x10 3x8	2x10 3x8	2x12 *3x10	2x10 3x8	2x12 *3x10	2x12 *3x10	2x14 *3x10	2x12 *3x10	2x14 3x12 *4x10	2x12 *3x10	2x14 3x12 *4x10
19	2x8	2x10 3x8	2x10 3x8	2x10 3x8	2x10 3x8	2x12 *3x10	2x10 3x8	2x12 *3x10	2x12 *3x10	2x12 *3x10	2x12 *3x10	2x14 3x12 *4x10	2x12 *3x10	2x14 3x12 *4x10	2x14 *3x10	2x14 3x12 *4x10
20	2x10 3x8	2x10 3x8	2x10 3x8	2x10 3x8	2x10 3x8	2x12 *3x10	2x12 *3x10	2x12 *3x10	2x12 *3x10	2x14 3x12 *4x10	2x12 *3x10	2x14 3x12 *4x10	2x14 *3x10	2x16 3x12 *4x10	2x14 3x12 *4x10	2x16 *3x12
21	2x10 3x8	2x10 3x8	2x10 3x8	2x12 3x10	2x10 3x8	2x12 *3x10	2x12 *3x10	2x14 *3x10	2x12 *3x10	2x14 3x12 *4x10	2x14 *3x10	2x14 3x12 *4x10	2x14 3x12 *4x10	2x16 *3x12	2x14 3x12 *4x10	2x16 3x14 *4x12
22	2x10 3x8	2x10 3x8	2x10 3x8	2x12 *3x10	2x12 *3x10	2x12 *3x10	2x12 *3x10	2x14 3x12 *4x10	2x14 *3x10	2x14 3x12 *4x10	2x14 3x12 *4x10	2x16 *3x12	2x14 3x12 *4x10	2x16 3x14 *4x12	2x16 3x12 *4x10	3x14 *4x12

* Size recommended for greater economy.

MAXIMUM SPANS LIMITED BY DEFLECTION

Based on modulus of elasticity 1,600,000 pounds per square inch, the live-load given plus a dead-load of 15 pounds plus weight of joist per square foot.
Deflection limited to one-thirtieth of an inch per foot of span.

Size of Joist	Joist Spacing Center to Center Inches	LIVE LOAD						
		40 Pound	50 Pound	60 Pound	70 Pound	80 Pound	90 Pound	100 Pound
2x8	12	13' 3"	12' 7"	12' 0"	11' 6"	11' 2"	10' 9"	10' 6"
	16	12' 2"	11' 6"	11' 0"	10' 6"	10' 2"	9' 10"	9' 7"
2x10	12	16' 8"	15' 10"	15' 2"	14' 7"	14' 1"	13' 7"	13' 3"
	16	15' 4"	14' 6"	13' 10"	13' 4"	12' 10"	12' 5"	12' 1"
2x12	12	20' 1"	19' 1"	18' 3"	17' 7"	17' 0"	16' 5"	16' 0"
	16	18' 6"	17' 7"	16' 9"	16' 1"	15' 6"	15' 0"	14' 7"
2x14	12	23' 6"	22' 4"	21' 4"	20' 7"	19' 10"	19' 3"	18' 8"
	16	21' 8"	20' 6"	19' 8"	18' 10"	18' 1"	17' 7"	17' 1"
2x16	12	26' 10"	25' 6"	24' 5"	23' 6"	22' 9"	22' 0"	21' 5"
	16	24' 9"	23' 6"	22' 6"	21' 7"	20' 10"	20' 2"	19' 7"
3x8	12	15' 4"	14' 7"	14' 0"	13' 5"	13' 0"	12' 7"	12' 3"
	16	14' 2"	13' 5"	12' 10"	12' 4"	11' 11"	11' 6"	11' 2"
3x10	12	19' 4"	18' 4"	17' 7"	16' 11"	16' 4"	15' 10"	15' 5"
	16	17' 10"	16' 11"	16' 2"	15' 6"	15' 0"	14' 6"	14' 1"
3x12	12	23' 2"	22' 1"	21' 2"	20' 4"	19' 8"	19' 1"	18' 7"
	16	21' 6"	20' 5"	19' 6"	18' 9"	18' 1"	17' 6"	17' 0"
3x14	12	27' 0"	25' 9"	24' 8"	23' 9"	23' 3"	22' 4"	21' 9"
	16	25' 1"	23' 3"	22' 10"	21' 11"	21' 2"	20' 6"	20' 0"
3x16	12	30' 9"	29' 4"	28' 2"	27' 2"	26' 3"	25' 6"	24' 10"
	16	28' 8"	27' 3"	26' 1"	25' 2"	24' 3"	23' 6"	22' 10"
4x8	12	16' 11"	16' 1"	15' 5"	14' 10"	14' 4"	13' 11"	13' 6"
	16	15' 8"	14' 10"	14' 3"	13' 8"	13' 2"	12' 9"	12' 5"
4x10	12	21' 2"	20' 2"	19' 4"	18' 8"	18' 1"	17' 6"	17' 0"
	16	19' 8"	18' 9"	17' 11"	17' 3"	16' 7"	16' 1"	15' 8"
4x12	12	25' 5"	24' 3"	23' 3"	22' 5"	21' 9"	21' 1"	20' 6"
	16	23' 8"	22' 6"	21' 7"	20' 9"	20' 1"	19' 5"	18' 11"

Note: In using this table to check the possibility of substituting one size joist for another, it should be kept in mind that a factor of safety has been applied in both the stress value assigned and in the floor load. For this reason, a certain amount of tolerance is permissible. For example, 3 x 12 joists spaced 16 inches center to center are limited to a span of 20 feet, 5 inches for a 50 pound load. It would be entirely reasonable to use this size joists with the same spacing for a 20 foot, 6 or 7 inch span.

